FAX

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Date: 12-Dec-97

To: Luanne Vanderpool

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From: Pete Vagt

Subject: Revised SOPs

COMMENTS

Hi Luanne,

Here are the REVISED pages for the IW5 and IW6 SOP ~~and a copy of your comments~~, with cross referenced numbers. to your comments

Please don't hesitate to call me with any questions

Upon your verbal approval, we will send out revised copies to Sheri, you, Steve Mrkvika and IDEM.

Pete

Luanne – Regarding comment #3, the driller does not anticipate a problem in removing the obstruction to knock out the bottom plug.
Michael

If you do not receive all pages, or if there are any problems with this transmission, please call (630) 691-5000. Operator: _____ *No. of pages including cover:* 5

6. Inspect filter pack material: proper gradation, proper material, contaminant free, sufficient quantity.

7. Inspect bentonite: 100 percent Wyoming bentonite with no additives, proper size, sufficient quantity for placing well seal.

B. During Well Installation

1. Determine depth of well placement as total length of assembled well string minus height of well string above ground surface.

2. Riser pieces should have water tight joints: either neoprene gaskets or Teflon tape. Do not use glue or solvent cement.

3. Accurately determine total well depth.

   a. Measure length of well riser pipe piece cut off from the total length of well string.

   b. Total well string length minus length of cut off piece equals total well depth (TD) measured from top of casing (TOC).

   c. The well top should stick up a minimum of 24 inches above the ground surface.

4. Install a temporary well cap to prevent any materials from falling into the well. Lower well string down into the casing to the predetermined depth.

5. Filter pack construction

   a. Introduce a well graded sand in a controlled manner: slowly add filter sand. Slowly retract the casing surrounding the screen.

   b. Filter pack will extend from the well bottom to the bottom of the confining clay layer (approximately five feet above the top of screen).

   c. Periodically use tape measure to check for bridging and to verify height of filter pack in comparison to the well screen.

6. Bentonite Seal

   a. Add approximately three feet of bentonite slurry #8 to the top of the sand filter pack.

   b. Record the type, size, and volume of sealant placed.

5. Collect three duplicate samples from each production well for TCL analyses. One sample volume will be provided to U.S. EPA for a split sample. A second sample volume will be sent to a laboratory for analysis. The third sample will be stored at 4°C in an on-site refrigerator pending receipt of the second sample by the laboratory. Once the laboratory has confirmed that they have all the sample containers and are able to extract the appropriate sample volumes for analysis, the third sample will be discarded.

F. Abandonment of IW5 and IW6:
After samples have been collected, IW5 and IW6 will be permanently abandoned by the following method:

1. Core over the 2-inch monitoring well with nominal 3-inch I.D. core barrel to near the base of the clay unit, as determined by gamma log results.

2. Install a 5-inch diameter steel casing over the core barrel using heavy bentonite mud and rotary drilling techniques.

3. Seat the casing, by a combination of twisting and driving, approximately two feet into the clay confining layer.

4. Knock the bottom plug out of the well bottom with a metal rod, or perforate the bottom of the two-inch casing, to allow for grout to flow out of the well. Lower a tremie pipe to the bottom of the well, mix a dense bentonite grout, and inject it into the well.

5. Collect water discharged from the well due to grout displacement. Dispose of at the PGCS treatment plant.

6. After full strength grout returns to the surface, slowly withdraw the tremie, continuing to inject grout to make up for the volume of tremie being removed.

7. Pull the two-inch monitoring well out of the ground, through the core barrel. If the well will not come out, core an additional few feet and try again. Repeat this procedure, as necessary, until the monitoring well can be removed. Note that the well screen may not be retrieved in a reusable condition (i.e., it may be damaged or may pull apart during withdrawal from the borehole).

8. Lower the tremie pipe to the bottom of the core barrel, mix a dense bentonite grout, and inject it through the tremie pipe.

9. Collect water discharged from the well due to grout displacement and dispose of at the PGCS treatment plant.

10. After full strength grout returns to the surface, slowly withdraw the tremie, continuing to inject grout to make up for the volume of tremie being removed.

5. Collect three duplicate samples from each production well for TCL analyses. One sample volume will be provided to U.S. EPA for a split sample. A second sample volume will be sent to a laboratory for analysis. The third sample will be stored at 4°C in an on-site refrigerator pending receipt of the second sample by the laboratory. Once the laboratory has confirmed that they have all the sample containers and are able to extract the appropriate sample volumes for analysis, the third sample will be discarded.

F. Abandonment of IW5 and IW6:
After samples have been collected, IW5 and IW6 will be permanently abandoned by the following method:

added step →

1. Core over the 2-inch monitoring well with nominal 3-inch I.D. core barrel into clay unit. – How deep? Comment is 2 SEE separate page

#1 →

2. Install a 5-inch diameter steel casing over the core barrel using heavy bentonite mud and rotary drilling techniques.

3. Seat the casing, by a combination of twisting and driving, approximately two feet into the clay confining layer.

deleted old step 4

4. Knock the bottom plug out of the well bottom with a metal rod, or perforate the bottom of the two-inch casing, to allow for grout to flow out of the well. Lower a tremie pipe to the bottom of the well, mix a dense bentonite grout, and inject it into the well.

5. Collect water discharged from the well due to grout displacement. Dispose of at the PGCS treatment plant.

6. After full strength grout returns to the surface, slowly withdraw the tremie, continuing to inject grout to make up for the volume of tremie being removed.

7. Pull the two-inch monitoring well out of the ground, through the core barrel. If the well will not come out, core an additional few feet and try again. Repeat this procedure, as necessary, until the monitoring well can be removed. Note that the well screen may not be retrieved in a reusable condition (i.e., it may be damaged or may pull apart during withdrawal from the borehole).

#4 →

8. Lower the tremie pipe to the bottom of the core barrel, mix a dense bentonite grout, and inject it through the tremie pipe.

9. Collect water discharged from the well due to grout displacement and dispose of at the PGCS treatment plant.

10. After full strength grout returns to the surface, slowly withdraw the tremie, continuing to inject grout to make up for the volume of tremie being removed.

11. Remove the core barrel from the hole, continuing to inject grout to make up for the volume of core barrel being removed. Top off the hole with grout.

12. Allow the grout to settle for a minimum of 12 hours.

13. Top off the hole again, if necessary, with grout or bentonite chips.

14. Cut off two-inch monitoring well at or near ground surface in accordance with Variance Number 97-45-612, granted by the Indiana Department of Environmental Management (IDEM), which modifies the Indiana well abandonment regulations. A copy of the variance will be provided in the final report.

#5

15. Weld a ¼-inch or thicker steel plate across the top of the two-inch well.

V. SPOILS MANAGEMENT

A. Water will flow from the production wells as the holes are filled with grout.

B. Place overflowing groundwater and grout into drums and allow the fluid to settle. After the grout and particulate matter have settled out, separate the water from the solids and process the water through the PGCS treatment system.

C. Consolidate the excess grout and particulate matter in drums and place the drums in the designated storage area at the off-site containment area.

D. Steam clean any well casing and wiring collected from the production wells for management or off-site disposal.

E. Soil cuttings generated during abandonment of IW5 and IW6 will be placed in drums or equivalent containers and stored at the staging area in the off-site containment area.

VI. SCHEDULE AND TIMING

A. The well abandonment will be completed in two phases. Phase 1 is the investigation phase which will involve pulling the pumps, geophysical logging, and packer testing the wells. Phase II will be the abandonment of the wells.

B. Phase I will be implemented after the following two actions are completed at the site: 1) construction of the barrier wall is completed; and 2) piping has been installed at the ACS facility from the water line to various process buildings.